

## CLAIMS

1. A process for improving the purity of a composition comprising a quaternary ammonium hydroxide comprising the steps of
- 5 (a) providing an electrolysis cell which comprises an anolyte compartment containing an anode, a catholyte compartment containing a cathode, and at least one intermediate compartment, said at least one intermediate compartment being separated from the anolyte and catholyte compartments by cation selective membranes,
- 10 (b) charging water, optionally containing a supporting electrolyte, to the anolyte compartment, charging water, optionally containing a quaternary ammonium hydroxide, to the catholyte compartment, and charging the composition comprising the quaternary ammonium hydroxide to be purified to the intermediate compartment,
- 15 (c) passing a current through the electrolysis cell to produce a purified aqueous quaternary ammonium hydroxide solution in the catholyte compartment, and
- (d) recovering the purified aqueous quaternary ammonium hydroxide solution from the catholyte compartment.
- 20 2. The process of claim 1 wherein the anolyte compartment is charged with an aqueous solution of a strong acid.
3. The process of claim 1 wherein the anolyte compartment is charged with an aqueous 1 to 10 wt% sulfuric acid solution.
- 25 4. The process of claim 1 wherein the intermediate compartment is charged with an aqueous solution comprising tetramethylammonium hydroxide (TMAH).

5. The process of claim 1 wherein the intermediate compartment is charged with an aqueous solution containing 5 to 40 wt% of TMAH.

5 6. The process of claim 1 wherein the intermediate compartment is charged with an aqueous solution comprising TMAH which has been used in the production of 4-aminodiphenylamine for a number of reaction cycles.

10 7. The process of claim 1 wherein the intermediate compartment is charged with an aqueous solution comprising TMAH which has been used in the production of 4-aminodiphenylamine for a number of reaction cycles and which contains aniline.

15 8. The process of claim 1 wherein the catholyte compartment is charged with an aqueous solution of a quaternary ammonium hydroxide which is the same as the quaternary ammonium hydroxide present in the composition to be purified.

20 9. The process of claim 1 wherein the catholyte compartment is charged with an aqueous 5 to 25 wt% TMAH solution.

10. The process of claim 1 wherein a three-compartment electrolysis cell is used.

25 11. The process of claim 1 wherein the electrolysis is stopped once a pH of 1 to 7 is reached in the intermediate compartment.

12. The process of claim 1 wherein the electrolysis is stopped once a pH of 4 to 7 is reached in the intermediate compartment.

13. The process of claim 1 wherein identical cation selective membranes are used.

5 14. The process of claim 1 wherein the cation selective membranes are perfluorinated membranes.

15. The process of claim 1 wherein the intermediate compartment is washed with a suitable solvent.

10 16. The process of claim 1 wherein the process is carried out batchwise.

17. The process of claim 16 wherein the intermediate compartment is washed with a suitable solvent at the end of the processing of each batch.

15 18. The process of claim 15 wherein the solvent is aniline.

19. The process of claim 15 wherein after washing with a suitable solvent, the intermediate compartment is washed with water.

20 20. The process of claim 15 wherein the intermediate compartment is washed with aniline followed by washing with water.